P1 1203110

THE UNITED STATES OF AMERICA

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August 02, 2004

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APPLICATION NUMBER: *60/458,199*
FILING DATE: *March 27, 2003*
RELATED PCT APPLICATION NUMBER: *PCT/US04/09104*

By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

P. R. GRANT
Certifying Officer

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03-28-03

PTO/SB/16 (10-01)
Approved for use through10/31/2002. OMB 0651-0032
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No. EV036313495US

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Thomas J. Janice L.	Webster McKenzie	West Lafayette, IN West Lafayette, IN

☐ *Additional Inventors are being named on the____ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

CARBON NANOFIBERS AS A NEURAL BIOMATERIAL

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 4
☐ Drawing(s) *Number of Sheets*
☐ Application Data Sheet. See 37 CFR 1.76
☐ CD(s), Number
☒ Other (specify) Postcard

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☒ Applicant claims small entity status. See 37 CFR 1.27.
☒ A check or money order is enclosed to cover the filing fees
☒ The Commissioner is hereby authorized to ~~charge filing fees or~~ credit any overpayment to Deposit Account Number 10-0435
☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($) $80.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☐ No.
☒ Yes, the name of the U.S. Government agency and the Government contract number are: National Science Foundation, Grant/Contract Title: IGERT

Respectfully submitted,

SIGNATURE

Date 3/27/03

TYPED or PRINTED NAME Bradford G. Addison

REGISTRATION NO. *(if appropriate)* 41,486

Docket Number: 3220-72618

TELEPHONE (317) 231-7253

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C.

BARNES & THORNBURG

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Indianapolis, IN 46204
(317) 236-1313
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group:	Unknown
Confirmation No.:	Unknown
Application No.:	Unknown
Invention:	CARBON NANOFIBERS AS A NEURAL BIOMATERIAL
Applicant:	Thomas J. Webster et al.
Filed:	Herewith (March 27, 2003)
Attorney Docket:	3220-72618
Examiner:	Unknown

CERTIFICATE UNDER 37 C.F.R. § 1.10

BOX Provisional Patent Application
Commissioner for Patents
Washington, D.C. 20231

Sir:

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail, in an envelope addressed to the Commissioner for Patents, Washington, D.C. 20231, on March 27, 2003. The Express Mail mailing label number is EV036313495US.

Respectfully submitted,

BARNES & THORNBURG

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INDS02 BADDISON 574571v1

PTO/SB/17 (1-03)
Approved for use through 04/30/2003. OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) **$80.00**

Complete if Known	
Application Number	Unknown
Filing Date	Herewith (3/27/03)
First Named Inventor	Thomas J. Webster et al.
Examiner Name	Unknown
Group Art Unit	Unknown
Attorney Docket No.	3220-72618

METHOD OF PAYMENT *(check all that apply)*

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

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Deposit Account Number: 10-0435

Deposit Account Name: BARNES & THORNBURG

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☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	750	2001	375	Utility filing fee	
1002	330	2002	165	Design filing	
1003	520	2003	260	Plant filing fee	
1004	750	2004	375	Reissue filing	
1005	160	2005	80	Provisional filing fee	80.00

SUBTOTAL (1) ($) **$80.00**

2. EXTRA CLAIM FEES FOR UTILITY AND

	Extra Claims		Fee from below	Fee Paid
Total Claims	-20** = 0	X	=	0.00
Independent Claims	-3** = 0	X	=	0.00
Multiple Dependent			=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	84	2201	42	Independent claims in excess of 3
1203	280	2203	140	Multiple dependent claim, if not paid
1204	84	2204	42	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) **$0.00**

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non - English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	410	2252	205	Extension for reply within second month	
1253	930	2253	465	Extension for reply within third month	
1254	1,450	2254	725	Extension for reply within fourth month	
1255	1,970	2255	985	Extension for reply within fifth month	
1401	320	2401	160	Notice of Appeal	
1402	320	2402	160	Filing a brief in support of an appeal	
1403	280	2403	140	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,300	2453	650	Petition to revive - unintentional	
1501	1,300	2501	650	Utility issue fee (or reissue)	
1502	470	2502	235	Design issue fee	
1503	630	2503	315	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR § 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Statement	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	750	2809	375	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	750	2810	375	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	750	2801	375	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($)

SUBMITTED BY				Complete *(if applicable)*	
Name (Print/Type)	Bradford G. Addison	Registration No. (Attorney/Agent)	41,486	Telephone	(317) 231-7253
Signature				Date	3/27/03

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EXPRESS MAIL NO.: EV036313495US

PROVISIONAL PATENT APPLICATION

of

Thomas J. Webster
(West Lafayette, IN)

and

Janice L. McKenzie
(West Lafayette, IN)

for

CARBON NANOFIBERS AS A NEURAL BIOMATERIAL

PRF Docket No. P-03014.P1

Attorney Docket 3220-72618

CARBON NANOFIBERS AS A NEURAL BIOMATERIAL

FIELD OF THE DISCLOSURE

The present disclosure generally relates to a composition for use as a prosthetic biomaterial and an associated method. The present disclosure particularly relates to a prosthetic biomaterial method that includes carbon nanofibers and an associated method.

BACKGROUND OF THE DISCLOSURE

Biomaterials commonly used in neural prosthetic applications are not designed to retain functionality while maintaining compatibility with respect to biological factors at the implant/tissue interface. In order to achieve proper cytocompatibility, it is desirable to determine the biomaterial surface characteristics that interface optimally with the pertinent neural cell types. Achieving similar mechanical properties to native tissue insures limited destruction of local cells. Electrical properties are also important to consider for neural implant efficacy to mitigate proper transfer or insulation of electrical current.

DETAILED DESCRIPTION OF THE DISCLOSURE

While the disclosure is susceptible to various modifications and alternative forms, specific embodiments will herein be described in detail. It should be understood, however, that there is no intent to limit the disclosure to the particular forms described, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the disclosure.

The current disclosure involves the use of carbon nanofibers as more effective central and peripheral nervous system biomaterials. Carbon nanofibers are recognized for their high electrical conductivity, high strength to weight ratios, and nanometer dimensionality. Material formulations contain carbon nanofiber materials and possess properties (cytocompatibility, conductivity. and mechanical) that are appropriate for different neural

applications in the central and peripheral nervous systems. The designed carbon nanofibers decrease function of cells that are involved in scar tissue formation around neural implants. Such unwanted scar tissue formation impedes electrical signal transfer and is detrimental to implant function. For these reasons, carbon nanofibers limit glial scar tissue formation and enhance neuronal functions for the next generation of neural prosthetic implants.

In particular, carbon-based material constructs that simulate the nanometer dimensions of components of the peripheral and central nervous system. Carbon nanofiber formulations possess enhanced surface, mechanical and electrical properties necessary to increase performance of neural probes, neural bridges, and other central as well as peripheral nervous system devices. Carbon-formulation geometry (fiber) and dimension (nanometer) that optimize surface mechanical, and electrical properties. These carbon nanofibers decrease glial scar tissue encapsulation; a major cause of decreased neural implant function. Current neural implant materials frequently fail to make direct contact with nerve and/or neurons due to glial scar tissue encapsulation. Carbon nanofibers decrease glial scar tissue formation, and accordingly can be utilized in a method that implants a prosthesis which includes carbon nanofibers in the body of an animal.

While the disclosure has been illustrated and described in detail in the foregoing description, such an illustration and description is to be considered as exemplary and not restrictive in character, it being understood that only the illustrative embodiments have been described and that all changes and modifications that come within the spirit of the disclosure are desired to be protected.

ABSTRACT OF THE DISCLOSURE

A composition for use as a prosthetic biomaterial and an associated method is described.